

What is claimed is:

1. A plasma display device, comprising

a plasma display panel comprising a discharge cell including a first electrode and

5 a second electrode; and

a driving unit for driving said discharge cell by giving a potential difference between said first electrode and said second electrode,

wherein said driving unit comprises a pulse generation unit capable of generating a voltage pulse which continuously changes from a first voltage to a second voltage, and

10 said driving unit controls said pulse generation unit to start outputting said voltage pulse as a voltage to be applied to said first electrode and then to stop the change of said voltage pulse at the point of time when said voltage pulse reaches a third voltage between said first voltage and said second voltage.

15 2. The plasma display device according to claim 1, wherein

said third voltage is set on the side of said second voltage relative to a firing voltage, and

said voltage pulse reaches said third voltage after a time longer than a discharge delay time passes from the point of time when said voltage pulse exceeds said firing

20 voltage.

3. The plasma display device according to claim 1, wherein

said voltage pulse includes at least one of a CR voltage pulse, a ramp voltage pulse and an LC resonant voltage pulse.

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4. The plasma display device according to claim 3, wherein

said pulse generation unit is capable of generating a rectangular voltage pulse,

and

said driving unit controls said pulse generation unit to output a voltage pulse in

- 5 which one of said CR voltage pulse, said ramp voltage pulse and said LC resonant voltage pulse is superimposed on said rectangular voltage pulse, as a voltage to be applied between said first electrode and said second electrode.

5. The plasma display device according to claim 1, wherein

- 10 when one field for image display is divided into a plurality of subfields each including an addressing period and a sustain period set after said addressing period, whether said discharge cell should be illuminated or not in said sustain period is determined in said addressing period and said discharge cell is illuminated in said sustain period if it is determined in said addressing period that said discharge cell should be
15 illuminated,

said driving unit starts and stops applying said voltage pulse in a period other than said addressing period and said sustain period in at least one of said subfields in said one field.

- 20 6. The plasma display device according to claim 5, wherein

said driving unit performs, with said voltage pulse, at least one of an operation for generating a discharge in said discharge cell regardless of a display history and an operation for generating a discharge in said discharge cell only when said discharge cell is illuminated in the immediately preceding sustain period.

7. The plasma display device according to claim 5, wherein
 said driving unit starts outputting said voltage pulse as a voltage to be applied to
 said first electrode before said addressing period, and
 said third voltage of said voltage pulse is set to a value between a ground
 5 potential and an address voltage applied to said first electrode in said addressing period in
 determining that said discharge cell should be illuminated in said sustain period.

8. A plasma display device, comprising
 a plasma display panel comprising a discharge cell including a first electrode and
 10 a second electrode; and

a driving unit for driving said discharge cell by giving a potential difference
 between said first electrode and said second electrode,

wherein one field for image display is divided into a plurality of subfields each
 including an addressing period and a sustain period set after said addressing period,

15 an address voltage is applied to said first electrode and whether said discharge
 cell should be illuminated or not in said sustain period is determined in said addressing
 period, and

said discharge cell is illuminated in said sustain period when it is determined in
 said addressing period that said discharge cell should be illuminated,

20 and wherein said driving unit performs the steps of:

(a) generating a first voltage pulse having the same polarity as said address
 voltage has, for generating a discharge in said discharge cell to generate wall charges, and
 outputting said first voltage pulse as a voltage to be applied to said first electrode; and

(b) generating a second voltage pulse having the same polarity as said first
 25 voltage pulse has, for generating a discharge in said discharge cell to control the state of

said wall charges, and outputting said second voltage pulse as a voltage to be applied to said first electrode,

both said steps (a) and (b) are performed before said addressing period and said step (b) is performed after said step (a), and

5 said first voltage pulse and said second voltage pulse have waveforms of which absolute values continuously increase toward a predetermined polarity.

9. The plasma display device according to claim 8, wherein

said driving unit further performs the step of:

10 (c) generating a third voltage pulse having a polarity reverse to that of said first voltage pulse and outputting said third voltage pulse as a voltage to be applied to said first electrode,

said step (c) is performed between said step (a) and said step (b), and

15 said third voltage pulse has a waveform of which absolute value continuously increases toward a predetermined polarity.

10. The plasma display device according to claim 8, wherein

said driving unit further performs the step of:

(d) reducing said wall charges in said discharge cell, and

20 said step (d) is performed before said step (a).

11. The plasma display device according to claim 10, wherein

said driving unit sequentially performs, in said step (d), the steps of:

(d-1) generating a fourth voltage pulse for generating a discharge in said
25 discharge cell and outputting said fourth voltage pulse as a voltage to be applied between

said first electrode and said second electrode; and

(d-2) generating a fifth voltage pulse for generating a discharge in said discharge cell and outputting said fifth voltage pulse as a voltage to be applied between said first electrode and said second electrode,

5 said fourth voltage pulse is a voltage pulse which is capable of generating a discharge at the rise and the fall of said fourth voltage pulse, and

 said fifth voltage pulse has a waveform of which absolute value continuously increases toward a predetermined polarity.

10 12. A plasma display device, comprising

 a plasma display panel comprising a discharge cell including a first electrode and a second electrode; and

 a driving unit for driving said discharge cell by giving a potential difference between said first electrode and said second electrode,

15 wherein said driving unit generates said discharge in said discharge cell during an operation for defining whether said discharge cell is illuminated for display or not, regardless of whether said discharge cell is illuminated for display or not.

 13. The plasma display device according to claim 12, wherein

20 said plasma display panel comprises a plurality of said discharge cells, and

 said discharge includes a first discharge and a second discharge weaker than said first discharge,

 said driving unit performs the operations,

25 as said operation for defining whether said discharge cell is illuminated for display or not, of:

sequentially applying an address pulse to said first electrode of each of said plurality of discharge cells to sequentially select said plurality of discharge cells,

generating said first discharge in a selected one of said plurality of discharge cells when a data pulse is applied to said second electrode of said selected discharge cell,

5 and

generating said second discharge in said selected discharge cell when said data pulse is not applied to said second electrode of said selected discharge cell.

14. The plasma display device according to claim 12, wherein

10 said driving unit comprises a pulse generation unit capable of generating a voltage pulse which continuously changes from a first voltage to a second voltage, and

said driving unit controls said pulse generation unit to start outputting said voltage pulse as a voltage to be applied to said first electrode, then to stop the change of said voltage pulse at the point of time when said voltage pulse reaches a third voltage

15 between said first voltage and said second voltage and thereafter to perform said operation for defining whether said discharge cell is illuminated for display or not.